



The Effects of Environment in Public Health Programs

BY

DR. A. E. BERRY

GENERAL MANAGER AND CHIEF ENGINEER

ONTARIO WATER RESOURCES COMMISSION

A paper presented before the Ontario

Public Health Association

at Toronto

September 1959.

RA
591
.E34
1959
MOE

Copyright Provisions and Restrictions on Copying:

This Ontario Ministry of the Environment work is protected by Crown copyright (unless otherwise indicated), which is held by the Queen's Printer for Ontario. It may be reproduced for non-commercial purposes if credit is given and Crown copyright is acknowledged.

It may not be reproduced, in all or in part, for any commercial purpose except under a licence from the Queen's Printer for Ontario.

For information on reproducing Government of Ontario works, please contact ServiceOntario Publications at copyright@ontario.ca

RA
591
.E34
1959

The effects of environment in
public health programs / Berry,
A.E.

80693

THE EFFECTS OF ENVIRONMENT IN

PUBLIC HEALTH PROGRAMS

by

Dr. A. E. Berry, General Manager and Chief Engineer

Ontario Water Resources Commission

Periodic assessment and critical examination of methods and results are well recognized as essential in the planning of public health programs. In doing so, objectives can be clarified, values determined, and effective plans drawn for the future. Conditions change rapidly and man becomes subjected to ambient forces which may have important bearings on his health and well-being. The environment in which he lives and works needs to be adjusted as far as feasible to his requirements and to his resistant ability. Knowledge of the effects of these environmental conditions, most of which are in the sanitary category is a primary requisite to any effective program in public health. Complete health and well being of the individual needs to be the objective at all times.

This search for the truth is well expressed in the words of Clarence Darrow - "True Wisdom is not achieved in a mere knowledge of facts, for the things we generally refer to as facts have a habit of altering with every change in the light. It is rather to be found in the sharpening of the tools of logic; in eternally searching, challenging, testing, accepting, rejecting and modifying - in a constant and courageous search for the truth". This philosophy of the open mind can be applied to advantage in the field of environmental sanitation.

Public health programs today cover a very wide field. This has resulted from popular demands for service and from a recognition of what can be done to make the world a better place in which to live. Technical advances have been conspicuous in this program. In fact, public health activities are now so broad in comparison with former years that much may either be taken for granted or there can be doubt as to what are the actual public health measures of today. Are some of the projects of former years still necessary now or is the absence of disease directly traceable to such conditions likely to create a false sense of security?

In this discussion it is proposed to limit the assessment of public health programs to that part related directly or indirectly to mans environment. This alone is a big field and one which is changing so consistently as to call for frequent appraisal. Its status in public health is not alone measurable in statistics on communicable diseases, but often on less tangible results as well.

What is Public Health?

At the outset it is desirable to recognize what constitutes public health or at least those programs in which health organizations should be concerned. It is always an escape route to utilize statistics on morbidity and mortality to justify the emphasis to be attached to these programs. It is easy to assume that if these recent figures are not impressive there is no reason to consider the problem further in the public health realm. Definitions of modern public health will aid in this analysis.

The World Health Organization defines health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity". Similarly the Expert Committee on Environmental Sanitation states that "Environmental Sanitation means the control of all those factors in man's physical environment which exercise or may exercise a deleterious effect on his physical development, health, and survival". Again Winslow states that the definition of "public health" suggested many years ago represents the modern conception - "public health is the science and the art of preventing disease, prolonging life, and promoting physical health and efficiency through organized community efforts for the sanitation of the environment, the control of community infections, the education of the individual in principles of personal hygiene, the organization of medical and nursing service for the early diagnosis and preventive treatment of disease, and the development of the social machinery which will ensure to every individual in the community a standard of living adequate for maintenance of health".

Phelps states - "public health deals, largely with the problems of man's relation to the environment. Its task is to assure the necessary favourable contacts and to minimize the unfavourable. Its problems are manifold and to their solution it brings the resources of many of the fundamental branches of science".

Effects of the Environment

The views contained in the preceding statements place emphasis on environmental features in public health programs. They refer not merely to the prevention of communicable diseases but to the much wider concept of total health and positive well-being. Environment is allocated an important assignment in this modern view of public health. The results cannot be measured so readily by statistics on diseases of a communicable nature, but this should not detract from their importance.

The emphasis attached to sanitary and environmental programs has varied over the years. From the early days of Chadwick when typhoid fever and similar diseases of the environment occupied the major field of public health there came a gradual lessening as measures for water purification and milk pasteurization showed remarkable statistical gains. Standardization and wide use of these procedures gave impetus to a feeling that the problem was solved and that the environment might be relegated to the background. Such might be an argument if these communicable diseases alone were to be considered as the yardstick. Similar control over other diseases not so directly associated with sanitation has been attained. At present the measures to combat these various communicable diseases are so well established that they no longer occupy a dominant role in the statistical summaries of public health accomplishments.

Modern views on public health needs have now been transferred to new objectives embodying the creation of a favorable environment

for mankind, and the adjustment of the many conditions which may affect his welfare, both in sanitation and elsewhere. Thus, today environmental sanitation has taken on a new perspective. It is aimed at the overall program of an environment which will be conducive to a state of complete physical mental and social well-being. This is well expressed in the publication "Environment and Health" by the U.S. Public Health Service as follows:

"The evolution of the concept of environmental health has accelerated in recent years. Inquiries into environmental factors in personal illness, originating far back in history, led to the early triumphs of sanitary engineering, especially in water and milk. The collaborative efforts of health workers since then have so far controlled infectious diseases that interest has begun to shift from the prevention of disease to the creation of health. This shift in emphasis has been accompanied by a growing realization that personal health is but an aspect of the total health of the community, that the enjoyment of good health personally implies the enjoyment of a wholesome, cheerful, and attractive environment. Those interested in public health now are aligning themselves and equipping new personnel for the complex task of improving the whole environment".

It has been said often that man is a product of heredity and environment. Phelps in "Public Health Engineering" states - "Environment represents the present-day opportunity to develop that hereditary endowment, to make good use of a poor inheritance or

poor use of a good one. It is quite plain that in regard to physical health and well-being, there is no hereditary endowment so good that it cannot be wasted away in a bad environment and rarely one so bad that it cannot be reclaimed in part at least, by favourable treatment.

Environment and Disease

Before departing from the long time role of disease control through environmental sanitation it is well to recall briefly the accomplishments in this field and to emphasize that these dangers may be only quiescent and can be a potent source of infection at anytime.

The reduction of typhoid fever and related diseases of the environment has been attained consistently over many years. These statistics have now almost vanished from the records. Knowledge and the wide application of measures for the purification of water, pasteurization of milk and control of stream sanitation leave little reason for failure to use them to the full. The greatest danger today results not from the efficacy of these protective measures but rather from a false sense of security brought about by absence of examples of such outbreaks and by carelessness in use and operation of these methods. There is a need to impress continually all in charge of these sanitary programs with the knowledge that these dangers do exist, and any break in the protective armour can lead quickly to disaster. The purpose of this discussion is not to emphasize the disease control aspect of the environment. That is well proven, but rather to examine other features less well known.

Factors in the Environment

Many factors in man's environment may have an effect on what is now considered to be a wider public health and well being. Phelps refers to air, water and food as the three essential channels of communication between the living organism and its environment. Public health recognizes that there may be an adaption of the environment to man by control of his physical and biological surroundings.

In present-day programs to serve the needs of mankind, especially in urbanized centres most emphasis can be put on water supplies, sewage and industrial wastes, stream sanitation, food, air pollution, refuse disposal, insects, odors, plumbing, housing town planning and others. These, either separately or collectively can mean much to the individual in his quest for the protective shield leading to the enjoyment of good health. The problem now centres on how these are to be provided and under whose direction most of these measures must be considered. They are in the realm of public responsibility since the individual is not generally in a position to provide them to advantage by himself. Modern standards of living call for effective control of these parts of the environment.

Responsibility for control of environment

When the need for the creation of a favourable environment has been recognized the next problem is who shall be responsible for these programs. Should they be under the specific direction of

organized health agencies or should other bodies capable of dealing with such matters be included in the program? It does seem that this should not be a major consideration. If a health department is best equipped to do this work it should be given the assignment. Similarly if some other body such as engineering, chemistry, bacteriology and general administration is best fitted for the task there should be no reason to not give them the responsibility. In any event the important consideration is that all are working in the public health field. There must be close coordination for best results. Cooperation in public health programs offers many advantages, while there should be no place in a matter of such importance for insular or antagonistic efforts.

Effects of Environment

A brief examination of some of the more significant factors in the environment of today will reveal both the problems and the measures being taken.

(a) Water Supply

The need for water supply is now receiving more recognition than at any previous time. This can be attributed to a public awareness that unless this commodity is available public health suffers, communities cannot develop and gradual deterioration must be expected. The trend to urbanization in this country adds emphasis to this need. The responsibility for this utility becomes a public one.

The emphasis on water supply has shifted from safety against disease, already established, to quantity and acceptable quality for all uses.

A supply that is not adequate at all times is defective in the eyes of the consumer. Similarly, water that is not free from odour, colour and turbidity or has an objectionable taste, or other physical or chemical constituents does not fit into a good public health environment. Thus the emphasis now has switched from the original requirement of safety of the supply to these many other factors. Responsible agencies are expected to ensure that these objectives are met.

There is an abundant supply of water in Ontario, but its distribution creates problems in many places. Pollution in one of many forms can destroy the availability of water to a community. The cost of bringing water long distances is high, but in spite of this, water is essential above all else and as such it can well be considered as a priceless commodity. As this country grows more and more emphasis must be given to conservation and distribution of water supplies.

(b) Sewage Disposal

Most public health and municipal programs have considered sewage and waste disposal secondary to a satisfactory water supply. This is logical, but the difficulty has been to secure public acceptance for these expenditures. While sewage disposal must always be considered in relation to disease prevention the major reason for action in many places is not because of this, but rather that sewage pollution causes objectionable conditions in the environment, adversely affecting sight, smell, recreation, fish and

wildlife, as well as normal use of the receiving stream. These conditions must be regarded as being inimical to the public health requirements of a good environment. Waters can only be conserved for repeated use, as they must be, if sewage and other wastes are adequately treated. The cost of this service may seem high to the householder who is not concerned with anything except removing this waste from his premises. Actually the cost of sewage treatment is not high in comparison with other common expenditures, often no greater than a package of cigarettes per week or a gallon of gasoline a week to the head of the household. Education of the taxpayer to accept these expenditures in his own interests can be assisted greatly by public health officials and others in this field.

(c) Industrial Wastes

The problem of industrial wastes has increased greatly in recent years. This is due not only to industrialization in this country, but to the wide variety and continually changing nature of these wastes. They do not lend themselves to standard forms of treatment as does sewage, and in many cases the method of treatment is either not developed effectively or the cost seems excessive.

The effects of industrial wastes on receiving waters may be far reaching. This is particularly so with taste producing properties. Oil and toxic wastes are to be avoided in streams. Here again the environment can be influenced to a great extent by lack of control over the wastes of industry.

The growing importance of industrial wastes is seen in the results of the two investigations of boundary water pollution between Canada and the United States. In the first of these in 1913 industrial wastes were a minor problem. In the second survey in 1946-48 they had become a major factor. Emphasis now is being placed on the development of methods for economical treatment of these wastes and to ensuring that industry will recognize that it is a part of the problem of production of goods for sale.

(d) Stream Sanitation

Clean streams and water courses are essential to a good environment. The danger of disease still persists, but reasons for programs in stream sanitation most advanced are those of recreation in its many forms, a pleasant environment for all and the protection of fish and wild life. Much of the pollution in streams is likely to spread no specific diseases, but this is no reason to consider it beyond the scope of public health programs or to consider it non-essential in the interests of the public welfare.

(e) Air Pollution

Growing importance is being attached to the control of air pollution, a major contact between the living organism and its environment. Polluted air has had injurious effects on health in a number of recorded instances, and deaths have resulted. However the importance of clean air is not alone due to the danger of toxic conditions, but rather to an improvement in the environment which will create better conditions in health and general welfare.

The report of the Select Committee on air pollution for Ontario in 1957 stated that air pollution is a serious health hazard. The report further adds - "we are convinced that air pollution is always injurious to health in some way, to a greater or lesser extent depending on the severity of the pollution. The health damage may be physical or mental or both".

This conclusion adds further weight to the need for action on environmental conditions if the objectives of full health are to be kept in mind.

(f) Food Supply

The need for control of the third channel of communication between the living organism and its environment, namely food has been so well established over many years as to call for little comment at this time. Much has been accomplished in the curtailment of diseases prone to be spread in this way. The measures are clear, but as with the other contacts with mankind today's trend must be on quality and conditions which are conducive to a favourable environment. The action to ensure clean foods of good nutritive value and well processed is all in this direction.

Other Factors

Several other conditions affect man's environment in a manner similar to those already discussed. Each can contribute to the well-being of the individual or it can prove to be inimical to his best interests.

Plumbing in the home is important for the elimination of unsanitary conditions and for adding to the betterment of the

environment. As such it must be installed according to recognized standards both of safety and service to the householder. It is clearly another factor in the overall effort to provide a good environment.

The U.S. Public Health Service in its investigation of the Relationship of Environmental Factors to Enteric Diseases (monograph 54) concluded that there was strong support for the premise that incidence of acute infectious diarrheal disease may be reduced significantly through selective modification of specific environmental factors within communities without regard to etiological or sociologic differences. It was condoned that specific environmental improvements, based on a knowledge of local deficiencies will invariably effect significant reduction in enteric disease. Plumbing installations were significant in this study and revealed the marked advantages from these.

Housing studies have been made in many places. Reports have established a parallel condition of lowered health and defective housing. These have not shown clearly that bad housing caused specific communicable diseases, but it is clearly established that housing is important in the welfare of the individual and as such it must be accepted as something in the broader field of public health and deserving of support.

In the same category must be listed town planning, a feature in municipal administration which is being given rightful emphasis. This is a program seldom administered by public health bodies yet

the health officer can contribute a good deal to its advancement. In doing so he is helpful in establishing a favourable environment and the resulting benefits to the urban dweller.

Refuse disposal and general cleanliness of the community, insect control and odours all can be listed as part of the program for an improved environment. Who is responsible for these activities is secondary so long as they are carried out.

The action being taken in these different parts of the human environment reflect the changes which have occurred in a period of time. They must be planned to meet the needs of the day. One major problem always is the means and procedures for putting these programs into effect.

Contributing Agencies

The nature of the programs necessary for a favourable environment calls for participation by many groups. Some are in the organized health services, others are in bodies which do not lay claim primarily to the field of public health. This in no way reduces the contribution they make to the health of mankind as previously defined.

It would be difficult to list all groups working in the field of public health or sanitary environment. They are found at municipal, provincial and federal levels of Government as well as in private endeavours. Some reference might be made here to governmental agencies operating at Provincial levels. Water boards, pollution control boards, water resources boards or Commissions and others are increasing in Canada, United States and

England. While they have different designations and have varied procedures and authority they are all aiming at the protection of the environment for the betterment of health. In the United States many commissions and boards operate at State level. The Province of New Brunswick is the latest to create a board for the control of water pollution. Thus the practice of assigning responsibility in the field of local environment to several kinds of bodies is well recognized.

The OWRC

In Ontario a new type of administration came into being in 1956 when legislation created the Ontario Water Resources Commission. This body was to deal with environmental conditions, particularly water supply, sewage disposal, industrial wastes, stream sanitation and plumbing. Some information on the objectives and procedures of this commission is appropriate for a conference in which topics of public health are the main feature.

The legislation of 1957 transferred from the Health Department most of those responsibilities associated with water supply and waste disposal. At the same time the program was expanded both in respect to supervision over these public services and to the construction and financing of these works for municipalities. Thus today the Commission's program embraces regulatory and construction procedures.

It will be seen that the chief objective of this program is to improve man's environment and to join with the several other factors in the environment which tend to promote public health in

its widest application. The growth taking place in Ontario and the move to urbanization make these measures of the highest importance.

This OWRC program is proceeding at a rapid pace. The proposal for making water supply available where needed is giving impetus to the construction of water works in small places and the development of adequate supplies in others where growth or industry calls for this. Safety of the supply and quality are given close attention. Similarly the treatment of sewage and other liquid wastes occupies a major part of the program. This is necessary not only to protect the health of the water user, but to ensure an environment conducive to enjoyment of living.

In this whole program of the Commission there is a desire to cooperate closely with organized public health agencies at all levels of government. These endeavours need to be integrated in an effort to secure effective results in similar programs. Some indication of what has been attained to date can be seen from the statistics on the construction programs of the Commission. At present 83 projects have been accepted for an expenditure of nearly \$40 million; 40 being for water and 43 for sewage. Twenty-four of these are already in operation. Many more are being developed.

Sanitary disposal of all wastes comes next to water supply. Stream sanitation is receiving much attention. New Sewage and

industrial waste treatment plants are aiding in this. Special efforts are being made to find and to correct waste outlets either from private residences, industry, or storm drains. These conditions are serious in some communities, especially where sanitary sewers have not been built. Lack of local supervision over connections to storm sewers has resulted in objectionable conditions at the outlets and for which the municipalities must assume responsibility. These surveys are undertaken both on a county basis and for each individual municipality. The investigations and remedial measures are planned in close co-operation with the local health officers and their staffs. The financial arrangements offered by the Commission add much to the opportunity for correcting these conditions.

Reference might also be made to the facilities of the Commission for carrying out these programs. A new laboratory of modern layout and equipment is nearing completion. It will serve the municipalities and industries, be available for research projects, and be advantageous in the training of operators and other personnel in the field of sanitary works. Every attention is being given to specialized training for the staff of the Commission. It is only in this way that maximum service can be rendered to the province and best use made of the facilities provided. All of this will require close cooperation with health agencies and others engaged in related fields of endeavour. Training of plant operators is a valuable complement

to the training of the Commission's staff.

Summary

In summary it can be said that control of man's environment to fit his needs requires renewed emphasis if health needs are to be interpreted in the broad sense envisaged by the statements of the leaders in this field. Prevention of specific communicable diseases, important as it is, is only one part of the objective which can be considered for the citizens of this country in the future, Many agencies can contribute to this program, some in organized health departments, others serving under different names.

In Ontario the Water Resources Commission takes its place in this field to play a part along with others. In the co-ordination and united action of all groups great benefits can accrue to all citizens.